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The Precision Investment Casting Process

From conversations and current literature we find that it is now possible to assess the potentialities of this modern adaptation of the "'lost-wax" process. This method of producing castings is not cheap, nor does it yield precision castings from the viewpoint of the design engineer. Mr. W. O. Sweeny, writing in the "Iron Age," states that "± 0.005 in. per in. with a minimum tolerance of ± 0.003 in. is commercially practical." These figures are pretty much the same as those given by Mr. D. F. B. Tedds in his recent Paper. Precision castings are in competition with sand and die castings, machined components, and, commercially, the field is *now restricted* to high melting point alloys which are difficult to machine. Being still in the course of development, there may be a broadening of the scope of the process so as to make it more competitive. Conditions for the development of the process were most favourable during the war, when experiments were very largely carried out for the Service departments and at their expense. Moreover, a proportion of these concerns were not, and are not, interested in the peddling of components for the engineering trades in general. New Government orders have been reduced and the total output of the country will not be greatly in excess of a ton a week. Yet research must continue if progress is to be made, and a prerequisite for this is the pooling of the knowledge so far gained. This done, the process needs to be re-examined fundamentally with a view to ascertaining where manufacturing costs could be reduced and, indeed, as to whether the present cycle of operations is the best way of tackling the problem. The essential assets of the process could be maintained by reserving its potentialities for the actual service surfaces. Thus we envisage the making of, say, undersized gear blanks and casting around their periphery high-grade wear-resisting alloys so as to give a component requiring a minimum of finishing before being put into service. This process is fundamentally not new, for an American firm has long been making composite castings of this character, whilst Sheffield almost traditionally uses it for the making of ingots—iron and steel "lumps"—to be worked-up into machine knives.

The current position of precision casting in the States, according to Mr. Sweeny, is summarised hereunder. The minimum cored wall thickness is of the order of 0.050 in. for a uniform small section. This can generally be held to a tolerance of ± 0.005 in. Edges can be cast to between 0.012 and 0.015 in. in thickness, providing that they can carry a gradual taper. Threads are still a very difficult proposition, as shrinkage and other problems have to be solved. Whilst the surfaces given by precision castings are smoother and cleaner than from other types of moulds, yet where they are large, minor imperfections are liable to appear. The amount of taper can be as small as half a degree per face. For the average casting the result of a parting line is a ridge about 0.002 in. thick by 0.006 in. high. The designer should provide the full information as to what he expects from each surface. For instance, small pits are not acceptable on components for food machinery and gas turbines, but in other cases they may be harmless. The largest casting regularly made by Mr. Sweeny for the Haynes Stellite concern weighs about 5 lb., but the maximum is dependent upon the method of casting and in his case, if made by pressure casting in conjunction with an electric furnace, 3½ lb. is the upper limit. Data of this type, coupled with that published recently, should help to place the whole subject of precision casting on a more realistic basis.

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British Cast Iron Research Association

The annual general meeting of the British Cast Iron Research Association was held yesterday week at the Waldorf Hotel, London. Dr. Harold Hartley presided. In proposing the adoption of the annual report, an extract from which was printed in our last issue, the president forecast further increases in the staff to carry out the programme which has been envisaged.

Dr. Harold Hartley was unanimously re-elected president and, as vice-presidents, the following were also re-elected:—Mr. H. H. Berresford, Mr. V. W. Bone, Mr. R. J. Rogers, Mr. E. Player and Mr. J. Shaw. The following members of council were re-elected:—Mr. P. A. Abernethy, Mr. W. R. Blair, Mr. V. Everard, J.P., Mr. V. C. Faulkner, Prof. D. Hanson, D.Sc., Mr. T. Makemson, M.B.E., Mr. A. E. Pearce, Mr. N. R. Rees, Mr. J. J. Sheehan. Mr. W. Todd, who retires from the coucil because, in his new position, he is not so intimately connected with cast iron as formerly, was cordially thanked for his services.

After Mr. Yeomans had proposed and Mr. F. Arnold Wilson seconded a vote of thanks to the Council and committees, which was accorded, the chairman, on behalf of the meeting, expressed their indebtedness to Mr. Pearce, the director, and his staff for their conscientious devotion to the interests of the Association and its members.

Copper Development Association

Speaking at the annual general meeting of the Copper Development Association at 11, Old Jewry, E.C.2, on December 8, Lt.-Col. the Hon. R. M. Preston, D.S.O., Chairman of the Council, said:—It is satisfactory to be able to report another year of steady progress. During this period the enlarged facilities of the Association at Kendals Hall came into full activity, and embraced some new ventures, including participation in public exhibitions. The Association had a stand at the British Industries Fair and another at the Building Exhibition just concluded at Olympia, in addition to the permanent exhibits at the London and Glasgow Building Centres and at the Engineering Centre at Glasgow. The Association's activities were again hampered by the difficulties and delays experienced in printing and binding. In spite of these difficulties, however, more than 25,000 books were despatched during the year, an increase of about 5,000 on last year's figure. Many applications had to be postponed. Probably every architect and engineer is already familiar with the Association's publications. The Association provides free of charge or obligation of any kind a highly specialised and expert service of technical advice, instruction and information. Moreover, in so doing it is not the sole object to concentrate only on an expansion of the use of copper, but rather at all times to improve the efficiency of its application, which is a matter not only of great national importance, but also in the best interests of its members.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

AN APPRECIATION OF AUSTRALIAN GOODWILL

December 5, 1947

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—I would like to put on record the thanks of the staff and employees of my firm for the parcels of food they have received from Messrs. Industrial Steels, Limited, of Lidcombe, New South Wales, Australia.

Each of my employees has received a 7-lb. food parcel, and I gather that this has been brought about by each of the employees of Industrial Steels, Limited, subscribing 1s. per week; this gesture of good friendship has been very much appreciated.

Yours, etc.,
A. G. CATTON

Catton & Company, Limited,
Yorkshire Steel Foundry,
Hunslet,
Leeds, 10

Notes from the Branches

South Africa

The September meeting over which Mr. J. H. West presided was devoted to the discussion of problems brought forward by individual members. The first question was raised by Mr. Richardson, who had only been in Johannesburg for some seven weeks. He was experiencing pock marks in manganese steel castings, weighing 7 to 8 cwt., having sections up to 6 in. thick. The steel was cast at about 1,430 deg. C., and apparently a cement bonded sand was used. The suggestions put forward as cures included the use of a sand with a higher sintering point; a larger grain size in the sand used; and a lower casting temperature. The second problem was, "What causes the penetration of bronze into cores?" This was raised by Mr. Graham, whose personal solution was the use of linseed oil bonded cores and careful casting temperature regulation. Helpful suggestions were the use of a mica paint; a close grained, but not too close grained sand; the study of Mr. J. J. Sheehan's work on the subject, and a reduction of the phosphorus content of the metal. Next came a general discussion on mould dressings, but castings not being a common denominator, it became obvious that a different technique was required for the various groupings.

The best discussion of the evening arose from the question, "What causes gas-holes in the top faces of iron castings?" It was asked by Mr. Marais, who drew upon the work of Zapffet Simms, involving hydrogen absorption as the cause. This brought up such questions as wet coke, dry blast for the cupola, and so forth. Mr. Teubes propounded a mechanical solution based on shrinkage, with better running methods as a cure. Much support was lent to both theories. Two other problems were raised, but considerations of time suggested their postponement to another meeting.

The Modernisation and Mechanisation of the Foundry Industry*

Re-organisation Plan for French Foundry Activities

By General R. Norguet

It is not proposed during this talk to study in detail any particular technical problem, as that is the purpose of the individual paper. The real object is to stress the application of mechanisation to the foundry so as to link it up with certain general aspects of the whole problem of French re-equipment and also to review certain conditions essential for success at the lowest cost and for completion in the shortest possible time-implying notable financial sacrifice—and, what is more important, not only for individual concerns, but also for the entire national economy.

During the occupation, France, whilst fighting against the invader, was busy preparing for its future and epecially its economic future despite the countless difficulties of the period. The time is now come to put these plans into practice. Work has begun, but there is still much to do.

Objects of the Plan

(1) The first of the conditions essential for success is a wide survey and collection of reliable data, covering each branch of the trade and the outside world. The foundry industry has not failed in this double duty. It is now making an examination at home, section by section, and it has sent abroad a number of missions, which have brought back much reliable data. The greater part of these have already formed the subject of reports and the work will be continued wherever it seems worthwhile.

(2) Technology rightly takes the pride of place in these surveys, but they should also deal with wider questions such as the commercial and financial considerations and even the very structure of the industry. One need only cite the following points:—The degree of desirable concentration of industry; multiple activities within one organisation; the application of cures for excessive subdivision—standardisation, specialisation, closing up of foundries and amalgamation of companies. In this connection a comparison with overseas countries is illuminating.

(3) One of the essential objects of mechanisation and modernisation is to obtain a low cost price associated with high quality. A country which cannot reach international quality and at an " inter-nation cost price " is well on the way to decadence. The criterion of production per head of population is characteristic. If this productivity be low, no amount of talking or political promises can stave off bankruptcy. A country of 40 millions where the average of the productivity is only one *n*th that of the countries with which a comparison can be made is no longer a country of 40 millions but one only worth $\frac{40}{n}$

The ability to export should be deemed as a characteristic sign and in any case though circumstances practically prevent export, an industry worthy of the name ought always to be a position to send its goods abroad.

(4) The economic status of an industrial organisation is invariably reflected in social life. If the general structure of the industry is bad and its equipment out of date, and if, because of that, the productivity of the workman cannot be raised to match his effort and enthusiasm, how can one imagine the paying of high wages? Whilst high wages are not the only social question, it is pure sophism to deny that they are an essential element. It should be unnecessary to add that these high wages should be real and not merely a reflection of lowered currency purchasing power.

Another advantage of the modernisation of equipment is the elimination of hard or dangerous jobs—which is so much to be desired. Without being one of the trades where such a question is very acute, the foundry is, however, one of those which are directly involved.

(5) It was stressed at the opening of this talk that France must carry through its re-equipment at the lowest cost. Employers are warned lest in their zeal for reconstruction they are led to make ill-considered purchases. It is only necessary to quote: " X (a competitor) has bought such and such a machine —I will follow suit "—" France is short of everything. For many years to come there will be a seller's market. I will equip myself to the maximum "—" The franc is perhaps no more threatened than other currencies, but it is perhaps no more stable than the others either. I must stock to the maximum."

This is nothing but misplaced enthusiasm, which is the exact opposite to my ideas; that buying of equipment should be done without a reasonable appreciation of the market, without envisaging specialisation, without trade agreements and the appropriate specifications would be absurd.

Rôle of the Advisory Service

I believe that the essential duties of the employers' federations and of the Commission for Modernisation over which I have the honour to preside is, not to interfere or dictatorially impose vetoes, but to furnish to the responsible heads of firms, figures, statistics, and

(*Continued on page* 332.)

*An abstract of an address given before the 21st Congress of the *Association Technique de Fonderie*. The Author is President of the Commission for the Re-equipment of the Foundry Industry as part of the " Monnet Plan."

Core Locations or Sets

By "Checker"

Correct positioning of cores in the mould is of primary importance, and to eliminate any risk of misplacement, the patternmaker should avail himself of some method to overcome this possibility when making the pattern and coreboxes. To achieve this object, core locations or sets can generally be incorporated on prints and coreboxes to guarantee the core position being correct with the mould; this applies especially to cores having some part of bosses or ribs, etc., whose position must agree with their counterpart on the outside of the casting.

Fig. 1 shows a flat produced on a circular print; the straight portion is cut to correspond with the mould bottom, thus giving a definite set on which the core will rest, the corebox having a similar part incorporated to match. Illustrated in Fig. 2 are the core sets necessary to guarantee a correct core location for an overhanging core, the Vee and square additions ensure that cores cannot be placed the wrong way round. Two sets, one each side giving a two point setting as shown, are generally found to produce a more accurate fitting than when only one is used. These core locations are generally made as an addition to the print size, and cut out in the corebox, and not cut in the print as shown in Fig. 3, which would make the two small pockets difficult to mould.

Another type of core set is shown in Fig. 4—this was necessary to eliminate any possibility of the core being positioned too far into the flange, a print extension being added on one side only to allow the corebox to have a flat open face for strickling. Core locations are not necessarily of any definite size or shape, but can be varied in accordance with the various needs of patterns for which they are required.

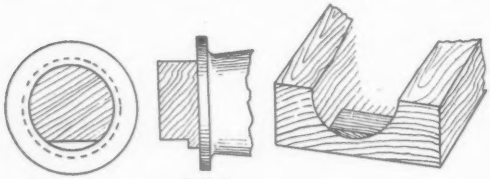

FIG. 1

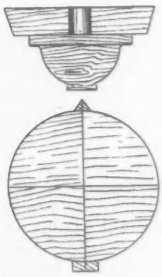

FIG. 2

FIG. 3

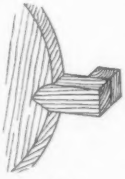

FIG. 4

FIGS. 1-4.—TYPES OF CORE SETS.

British Standards Institution

The Monthly Information Sheet for September, 1947 (just received), lists amongst new Standards issued No. 1398:1947, Carbon-molybdenum steel castings (2s.). This British Standard covers the requirements of carbon-molybdenum steel castings for general engineering purposes in which the castings will be subject to stress at elevated temperatures. The chemical composition of the steel is specified and recommended heat-treatment procedures are included in appendix A. Test requirements relate to the tensile and bend tests and provision is made for radiographic examination and hydraulic testing, where appropriate. Details are included of process of manufacture, fettling and dressing, freedom from defects, testing facilities, branding and repairs to castings. Appendix B gives recommendations with regard to welding procedure.

Amongst revised Standards issued there is No. 466:1947, Electric overhead travelling cranes for general use in factories, workshops and warehouses (4s.). This British Standard applies to electric overhead travelling cranes, that are power driven in all motions, for general use in factories, workshops and warehouses, whether working indoors, under cover, or exposed to weather. Minimum factors of safety are given, together with detailed requirements of the crane structure. Drawings are included in regard to hoisting equipment, brakes, controls, power units, electrical protective gear, lighting and heating. Qualities of material are specified for all important parts, together with requirements for the performance testing of completed cranes.

The Amendment Slips issued include No. PD683, 1358:1947, Colours for vitreous enamel finishes; PD694, 1189:1944, Cast-iron baths for domestic purposes, and PD696, 1329:1946, Metal lavatory basins.

Under the caption "New Work Started," there are Steel castings for resistance to heat and corrosion, and High magnetic permeability steel castings; and, under "Draft Standards Circulated for Comment," No. CJ513, Grey-iron castings (superseding B.S. 321 and B.S. 786); No. CJ1461, The determination of silicon in pig-iron and all types of plain and alloy steel other than high tungsten and high tungsten-molybdenum steel, and No. CJ1462, The determination of sulphur in steel and ferro-alloys.

The following draft code has been circulated by the B.S.I. on behalf of the Codes of Practice Committee for Civil Engineering, Public Works and Building Constructional Work formed under the ægis of the Ministry of Works:—CP(B)674, Manholes (2s.).

The priced specifications are available from the Institution at 28, Victoria Street, London, S.W.1.

Pattern Equipment for Mechanised Production in a Light Castings Foundry*

By James A. McIntosh, Bonnybridge

To make the intricate patterns required for the production of light castings on moulding machines the following method has proved accurate and economical. It consists, broadly speaking, of taking the impression from the front and back of the original patterns and casting separate plates off these impressions, and having both plates of equal thickness and so located that they make a perfect match. The method has been carried out on three different sizes of plates which vary in thickness, according to their size. In this paper the method for the 20 in. × 26 in. size only is described and illustrated.

Equipment Required

A wooden frame (Fig. 1, Part 1) is made to suit the size of moulding box, namely, 20 in. × 26 in., having two contraction allowances on the length and breadth and two machining allowances on the thickness. Only one machining allowance is provided on the edges. The projections shown on the photograph form fixing points for the subsequent machining operations. This is the master wooden frame. A casting is then made from this pattern and machined on either face to a standard thickness.

The locating pin centres are then marked off accurately on this frame. An error of not more than 0.005 in. is permissible on the diagonals. It is important that these centres should form a perfect rectangle, because the matching of the twin plates to be made depends on this. The centres marked are bored and reamed to ½ in. dia., and as the moulding boxes to be used on the machines have a round hole at one end and an elongated one at the other, this frame is marked accordingly R. and E., so that confusion is avoided when the pattern plates have to be matched. The holes referred to may be seen in Fig. 1, Part 2. This is the pattern-moulder's master jig.

*Awarded joint first prize in a Short Paper Competition organised by the Scottish Branch of the Institute of British Foundrymen.

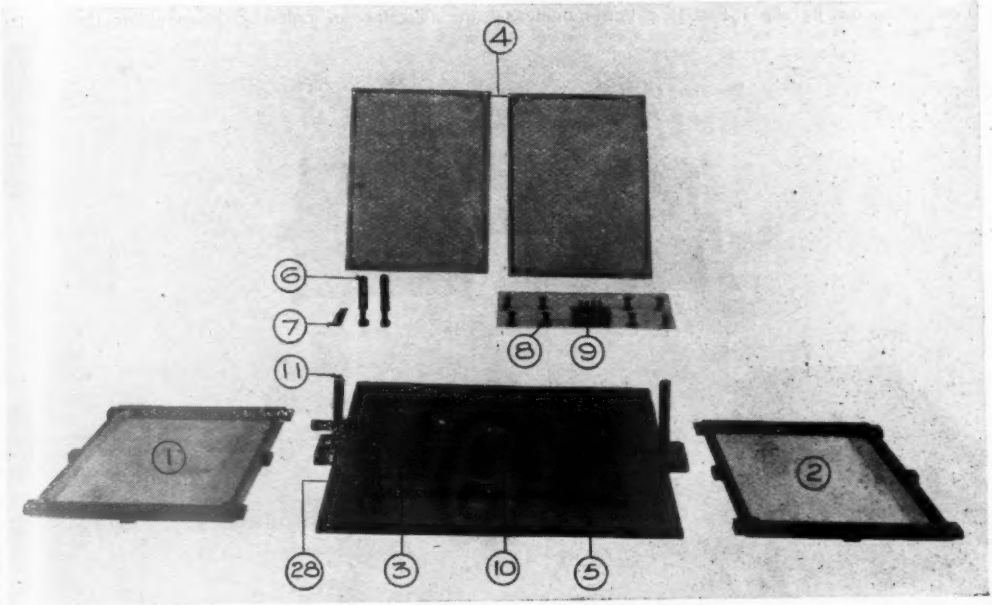

FIG. 1.—PARTS REQUIRED BY THE PATTERN-MOULDER.

Pattern Equipment

Making the Master Jigs

Next to be made are eight reels and pins (Fig. 1, Parts 8 and 9), preferably of stainless steel, which is affected by molten iron much less than ordinary mild steel. These reels have a hole through them reamed to ½ in. dia., and the pins must be a very neat sliding fit in the holes. The length of pin required is the length of the reel plus the thickness of the plate to be cast. The reels must be large enough to prevent movement during the moulding operations required to make the twin plates. The pattern-moulder's jig frame (Fig. 1, Part 2) is next placed on a machined aluminium plate Fig. 1, Part 5), and then, midway at each end, a snug suitable for the machine moulding box pin centres. Into each of the ½ in. reamed holes a locating pin is fitted (Fig. 1, Part 28), and over each pin a reel. Two solid castings are made from this frame as shown in Fig. 2, Part 12. The part of the pin which is cast into the thickness of the plates is coated with an aqueous mixture of equal parts of lime and plumbago to facilitate the later removal of the pins and to maintain accuracy. These plates are cast solid to obtain a contraction equal to that of the subsequent twin plates. It will be found that they make a perfect match one to the other, and one of them is prepared as the fitter's master jig (Fig. 2, Part 12).

The following jigs have now been made:—(1) master wooden jig (Fig. 1, Part 1); pattern-moulder's master jig (Fig. 1, Part 2); and (3) fitter's master jig (Fig. 2, Part 12). To make provisoin for the possible breakage of these vital jigs it is advisable that replicas be drilled from them. It should be noted that this time it is unnecessary to make the fitter's jig solid.

Working Jigs

Now the working jigs are made, as illustrated, *i.e.*, (1) pattern-moulder's working jig (Fig. 1, Part 3). and (2) fitter's working jig (Fig. 2, Part 13). All jigs are bushed with hardened steel bushes. This completes the jigs required for moulding and checking the twin pattern plates. The patternmaker's working jig is machined to the exact thickness required for the twin pattern plates.

The stools shown in Fig. 2, Part 15, are similar to the actual machine stools, and are used to make trial castings from the prepared pattern plates when the actual moulding machine is not available, as, for example, when the pattern plant is being prepared before the actual machines have been supplied from the makers. It is advantageous to prove the plates by hand ramming and make them perfect before putting them into full production on a mechanised plant.

Accessories Required

Fig. 1, Part 5, shows the machined aluminium plate used for setting the pattern plates, and it will be noticed that it is jig drilled to suit the four corner locating pins on the pattern-moulder's plate frame. This has the advantage of reducing the moulding time on the

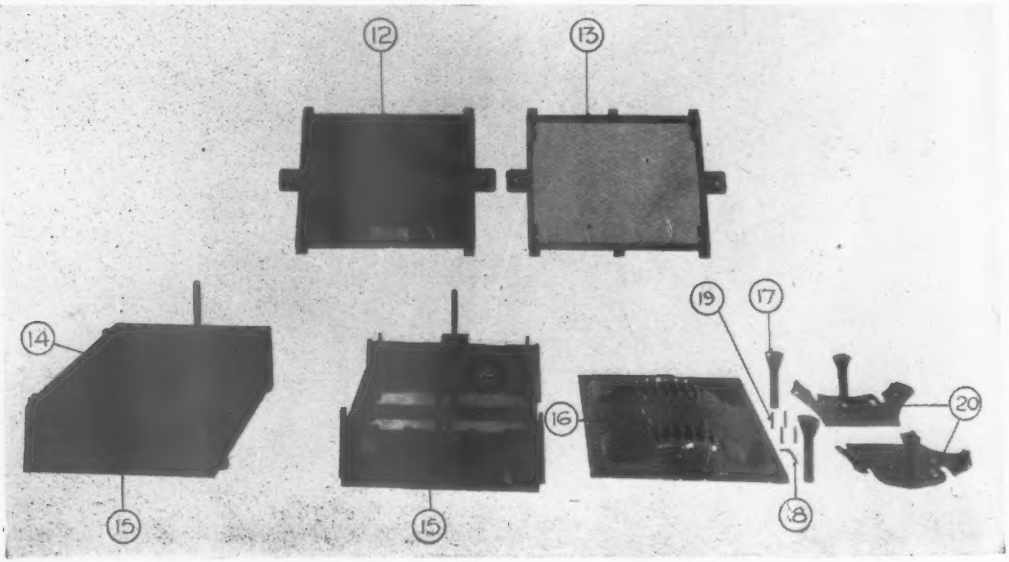

FIG. 2.—EQUIPMENT FOR FITTING-UP THE PLATES.

twin plates if the patterns to be plated are of such design that they can be placed directly in the pattern-moulder's frame, thus avoiding the need for ramming a false cope. Fig. 3, Part 21, illustrates four half moulding boxes which should be designed to accommodate the whole range of twin plates to be made. It is very important that these boxes be true and interchangeable in every respect. The accessories shown in Fig. 3, Parts 24, 25, and 26 need little explanation, as they are parts commonly used in the making of ordinary pattern plates, namely, bolts, pins, and distance pieces for plate thickness. It should be noted, however, that Part 27 is a loose bush for the box pin centres, made in this way to allow the pins to be easily removed or reversed from cope to drag in the moulding operations. Fig. 3, Parts 22 and 23, are parting jacks and washers respectively. They are accurately made and provide a means for obtaining a perfect parting when the cope is being removed from the drag. The need for this will be appreciated as the box pin centres have only 0.005 in. tolerance. It is impossible to lower or part these boxes by hand owing to the accuracy of the pin centres. The washers are placed on a tenon at the end of the jacks to provide the resistance for same.

Three sets of box pins are used, namely, "tight pins," "slack pins," and "long pins." The difference in diameter of "tight" and "slack" pins is 0.003 in. The tight pins are used when ramming the matching faces of the plates and the "slack" ones when ramming the backs or parting the boxes. The "long pins" are used when making plates with deep cods, since they allow the plates to be raised or lowered as required, to balance the amount of sand in the cope and drag of the finished plates.

To mould the plates as illustrated in Fig. 2 Parts 14 and 16, the patternmaker's jig frame is first placed on the aluminium plate with the patterns in position as shown in Fig. 1, Parts 3, 5, 10, 11, and 28. Next the frame is removed and the reels (Fig. 1, Parts 8) are placed in position on the aluminium plate and each located by passing a pin through the reel and the bush in the plate. One part of the moulding box, secured with cotters (Fig. 1, Part 7), is rammed up. After turning it over, the pins are removed from the reels, the cotters are released and the aluminium plate taken off. On this part of the mould a proper parting is then made, and one of the aluminium frames (Part 4, Fig. 1). is put on and located, as before, with pins. The second box part is then fitted, rammed up, and later removed, again by the use of jacks, and placed on a prepared bed. This half forms the cope of the mould which will be cast for the drag twin plate of the particular job.

If the parting of the first half mould is damaged it is repaired and a third part is rammed up and removed, using the reels and pins and jacks in sequence as before. The patterns from the first part mould are then placed into the second, which contains the light aluminium frame. The second aluminium frame (Part 4, Fig. 1), is put over that already in position and located. A mould is rammed up on this, and this too separated with the use of the jacks. This cope will eventually form the back of the cope twin plate.

The next operation is to frame up the two moulds complete with their reels as if making an ordinary pattern plate. These now are the "drags," so that the plates may be cast face downwards in the mould to ensure clean castings. The second and third half-moulds are the "copes" for these drags. The runners are cut in the usual way; a pin, coated with the lime-plumbago mixture, is dropped into each reel; distance pieces are placed on the corners; the boxes are closed (using the jacks), bolted together and cast.

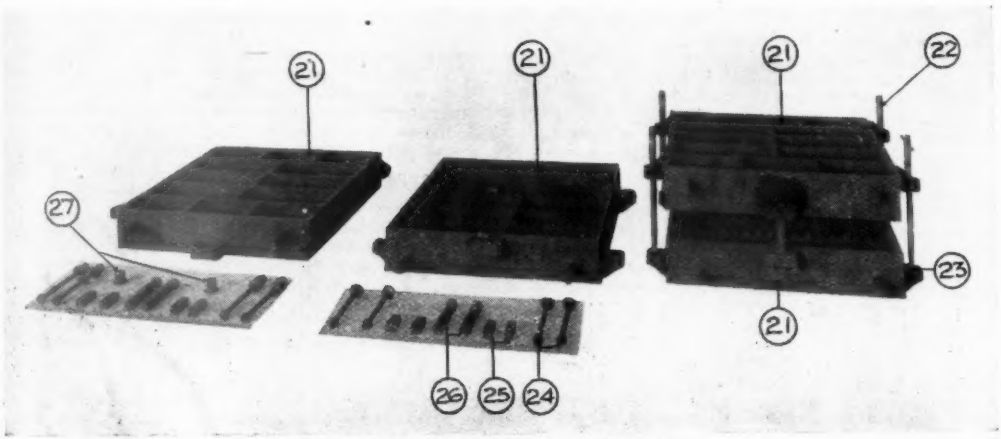

FIG. 3.—MOULDING-BOX PARTS AND ACCESSORIES.

Runners

It may be seen from the illustrations that the runners on the plates for casting the actual job are made of aluminium; they are mounted after the plates have been filed up. This has many advantages. For example, it makes the pattern-moulder's job easier, and the runners, if detachable, can be simply adjusted should they be too heavy or the design prove to be wrong when the job is tried out. The original patterns for the runners are made of plaster of paris, which can be cast and cut to the most awkward shapes.

Over 100 pairs of pattern plates for castings of greatly varying shapes and ranging from $\frac{5}{32}$ in. thick, have been produced by this method, and so far none has failed to match accurately. The stools shown in Fig. 2, part 15, with slight alterations, make excellent drilling and planing jigs for the engineering department.

Useful Mould-making Data

Folder No. 197 issued by the Osborn Manufacturing Company of America and sent to us by J. W. Jackman & Company, Limited, of Manchester, contains a useful table for calculating the applied pressure for a wide range of surface areas when making moulds by squeezing. A note accompanying the table reproduced below states:—In producing moulds on machines, in most cases, best results are obtained by a combination of jolting and squeezing the sand to the required mould hardness. Squeeze pressure for aluminium should be approximately 25 lb. per sq. in. of flask area; for brass or light grey iron from 25 lb. per sq. in. upward, depending on the bond and flowability of the sand; for heavier grey iron from 35 to approximately 50 lb. per sq. in.; for steel a minimum of 40 lb. for light castings upward to 70 to 75 lb. per sq. in. A prepared table of cylinder diameters and areas giving the effective pressures on the flask area is a handy reference.

An example of its use is as follows:—Take the case of a light grey iron casting made in a 20-in. by 20-in. mould, with area of 400 sq. in. Following down the column under 25-lb. squeeze pressure (suitable for grey iron), 392 sq. in. is the closest to 400. Following this horizontal line across to the left, it is seen that a piston with minimum diameter of 13 in. is required, giving a total effective pressure of 9,800 lb. If higher squeeze pressure is required, say, 30 lb., the next column of areas indicates a minimum piston diameter of 15 in. is required. If the casting should be steel and a heavier type, a squeeze pressure of about 60 lb. should be used. In this case the table shows minimum piston diameter of 21 in. to be necessary.

THE WEAR SHIPBUILDERS' ASSOCIATION has decided not to take part in the British Industries Fair at Birmingham in 1948, in view of the fact that the Fair is intended to increase the display of smaller goods for the export trade.

ON DECEMBER 26 the Falkirk Section of the Scottish Branch of the Institute of British Foundrymen will hold a meeting at 7 p.m. at the Temperance Café, Lint Riggs, Falkirk, when a Paper, entitled "Converter Steel," will be presented by W. Bulloch.

THE CAPITAL OF Vandervell Products, Limited, general, mechanical and marine engineers, etc., of 5-6, Bucklersbury, London, E.C.4, has been increased by £100,000 beyond the registered capital of £500,000, out of which 27,503 shares of £1 have been redeemed.

TABLE I.—*Squeeze Pressure Data.*

Squeeze piston diameter (inches).	Squeeze piston area (sq. in.).	Total effective pressure developed at line pressure of 80 lb. per sq. in. with allowance for average load.	Squeeze pressure per square inch. 80 lbs. line pressure at machine.)							
			25.	30.	35.	40.	45.	50.	60.	70.
			AREA OF MOULD							
10	78.5	5,700	228	190	163	—	—	—	—	—
12	113.1	8,300	332	276	237	208	185	166	—	—
13	132.7	9,800	392	326	280	246	218	196	163	—
14	153.9	11,200	448	374	320	280	249	224	187	160
15	176.7	12,300	492	410	352	308	273	246	205	176
16	201.1	14,000	560	466	400	350	311	280	233	200
18	254.5	18,000	720	600	514	450	400	360	300	257
19	283.5	19,800	792	660	566	495	440	396	330	283
20	314.2	22,000	880	734	628	550	489	440	367	314
21	346.4	23,800	952	794	680	595	528	476	397	340
24	452.4	31,400	1,256	1,045	896	785	697	628	527	448
28	615.8	43,500	1,740	1,450	1,242	1,174	966	870	725	621
30	706.9	49,100	1,964	1,635	1,402	1,228	1,090	982	817	701
33	855.3	59,300	2,372	1,973	1,690	1,483	1,316	1,186	987	845
36	1,017.9	70,200	2,808	2,340	2,006	1,757	1,560	1,404	1,170	1,003

To use table, multiply length and width of mould to get area. Then find mould areas in above table nearest to the area. Squeeze piston diameters and pressures per square inch on mould can then be readily determined.

The Foundry Position and Outlook

Mr. A. G. Harrison outlines the needs of the Industry

Presidential Address at the Birmingham, Coventry and West Midlands branch of the Institute of British Foundrymen

At the opening meeting of the session, held at the James Watt Memorial Institute, Birmingham, members heard Mr. A. G. Harrison, of Wolverhampton, deliver his Presidential Address, which carried a survey of conditions in industry.

In the course of his remarks, Mr. Harrison said to-day everyone realised the importance of the coal-mining industry, due to the fact that the shortage of coal had already caused a major crisis. The importance of the foundry as a basic industry was not so generally recognised. Yet almost every industry was dependent on castings in some form or other, and it could be reasonably claimed that each worker in the foundries kept at least ten other people employed after his products left the foundry. It was said that during the war years 14,000,000 tons of iron castings were produced, and the difficulties experienced in all directions to-day were as great, if not greater in some cases, than during the war period. Even so, the output of iron castings in the second quarter of this year amounted to 714,787 tons, which was equivalent to an annual rate of production of 2.86 million tons. This, according to the Council of Ironfoundry Associations, was the highest output ever officially recorded. It had been achieved in spite of shortages of skilled labour and essential materials, such as foundry pig-iron and cupola coke. If these handicaps could be removed to allow the existing capacity of the ironfounding industry to be fully employed, even higher outputs could be attained.

For the export drive to be really successful it was necessary that full advantage should be taken of the capacity available in the 1,750 ironfoundries in the country. An increase of 5 per cent. would make a potential of 3,000,000 tons of castings per year. This could be achieved with the present labour forces, provided absenteeism were reduced to a minimum and managements and workers pulled together. However, all foundries, whether large or small, were faced with two major problems—labour and supplies.

Better Amenities

So far as labour was concerned, the foundry was not the only trade requiring recruits, as could be seen by the advertisements appearing in the Press; but unless foundry requirements were reasonably covered, many of the other industries would not be able to function at 100 per cent. and fulfil the requirements of the export drive. Many hard things were said about foundry work being hot, heavy and dirty, and it would be well to bear in mind that this could also be said of many of the other basic industries. Efforts had been made, and were still being made, by all those who had the interests of the industry at heart, to improve working conditions in the foundry. The recently published Garrett report gave a clear indication of the lines to be followed.

Workers were frequently inclined to resent the introduction of new methods involving labour-saving devices, but after a period of trial, appreciated the advantages to be gained. Already in many foundries washing facilities were good, but these were frequently not used to the fullest extent, or in the way they should be. In spite of this managements must persevere, trusting that the generation now coming forward would eventually work closely with them, using the new amenities to the full and to the advantage of all.

Apprentice Recruitment

It was a well-known fact that apprentices for the machine shop could be readily obtained, but very few chose the foundry. This was puzzling to those who had been associated with foundries for twenty or thirty years for, in their opinion, there were as many opportunities for getting-on in the foundry as in other trades. The work itself was equally interesting, and became more so as the years passed and as a greater degree of specialised knowledge was required. In order to encourage youth to enter the industry, many good apprenticeship schemes were in operation, and those who had attended the Nottingham Conference were very much impressed by the excellent training centre of the Stanton Ironworks Company, Limited. Such schemes, of course, could not be made available to all foundries, but there was no doubt that a number of the smaller foundries could provide excellent training by an interchange of apprentices.

Wherever the demand was great enough, local technical colleges were only too willing to give all the assistance they could, and a number were already equipped with small experimental foundries. Some of the juvenile departments of the Ministry of Labour, under the auspices of the education committee, had included in their curriculum systematic visits to local works for boys and girls during their last year at school. So far as the boys were concerned, the visits to foundries were very much enjoyed, but as the scheme was yet in its infancy, it was rather difficult to assess the results. The National Foundry College at Wolverhampton was shortly to be opened, and it was hoped that the efforts of its sponsors would be amply rewarded by a good enrolment and by the re-entry of well-trained foundrymen, who would ultimately occupy managerial positions in the industry.

The Institute, in conjunction with other authorities, had also been extremely busy on the question of education for the foundry worker. In July last, the Birmingham Branch formed a Student Section, and they sincerely wished it every success. These activities indicated the effort that had been spent on the question of

Foundry Position and Outlook

amenities and education for the foundry worker by the Institute, managements and other competent bodies.

Shortages

The other major problem of all foundry managements to-day was supplies, mainly iron and coke. Many foundries were working from hand to mouth, and those more favourably placed found their working stocks seriously depleted. At the present time very few could be certain of their position very far ahead. In June, 28 per cent. of the blast furnaces in blast were producing foundry iron. Unfortunately, the number of furnaces in blast had gradually decreased from 99 in December, 1945, to 89 in June, 1947. They realised that there was a big call for basic iron, but, should it be decided that basic iron was number one priority, or if further furnaces were to go out of blast due to lack of raw materials, the possibility of even keeping up present output from ironfoundries was rather remote.

The "shut-down" in February was a great shock to all industrialists and, for many, probably the first occasion of a total cessation of work. It was very disturbing even at the present time to hear that electricity might be cut off between the hours of "so and so" the next day in certain areas of the country. If this was due to generating plant being under repair, they must hope that the repairs would soon be completed. They were certainly up against a new set of conditions for their motive power. They wondered how the proposed staggered schemes for industry as a whole would work and, where supplementary sources had been installed, what would be the effect of any serious electricity cuts that might arise during the winter. These questions might be more effectively answered during the next two or three years, during which new generating plant would be installed.

Hours of Working

The major recommendation in the present emergency for increased production in the interests of the export drive was longer hours of work. So far as the foundry was concerned, where the physical effort required of workers must be taken into consideration, this was perhaps not the best approach to the job. A 5 per cent. increase in production in the present hours would, in his opinion, be a better recommendation. This increase, together with the one mentioned previously which was concerned with avoidable absenteeism, could represent a 10 per cent. increase in production, and would be really helpful to those who were awaiting deliveries of iron castings. A further factor which in his opinion had had a very marked bearing on the efficiency of foundries was the instability of some sections of labour. In many of the large foundries there was a large percentage of workers which had remained constant; but there was an appreciable proportion always on the move for some obscure reason, and such workers never really became effective units of the industry.

In conclusion, he would say that, in spite of all these difficulties—and they were real ones; some, indeed, outside their control—he was certain that foundry managements, with the co-operation of the workers, would pull together and do their best to overcome any obstacles which might arise.

Mr. Harrison was cordially thanked for his address.

Subsequently Mr. J. Hird read the Paper containing suggestions for improving conditions in the foundry, which he submitted for the F. J. Cook award and which gained one of the prizes.

Publication Received

Industrial Lighting. Philips Electrical Limited, Century House, Shaftesbury Avenue, London, W.C.2, in their Publication No. A.161, describe a line of sodium industrial lighting fittings and give technical data. The high luminous efficiencies of these sodium lamps and long useful life have resulted in their extensive use for industrial lighting, especially for those applications where colour discrimination is unnecessary as distinct from increased visual acuity and economy in electricity. This 4-page pamphlet is produced in a pleasing canvas embossed paper.

French Re-organisation

(*Continued from page* 325.)

basic data which will enable them to make decisions for themselves (but also in the general interest which comes to the same in the end) on a sound basis and so that their particular interests are properly taken care of.

An obvious principle should be, moreover, to guide the industrialist who is undertaking re-equipment. It is not sufficient to acquire a few ultra-modern machines, but rather there should be a homogeneous general re-organisation of the shops, and the machines bought (often at great financial sacrifices) should, when installed, yield the high output which governed their original selection.

This problem of organisation is wide; it embraces arrangement of machines, their servicing and upkeep, manufacturing processes, control, research laboratories, etc. All this presupposes a certain measure of aptitude amongst the staff and a suitable division of this latter quality between preparation and execution of projects. It is necessary to draw attention to the fact that the technicians associated with the institutes, the *Centre Technique* and more particularly those attached to the various departments of the employers' federations are available to firms which have not yet consulted them, but which should have done so.

Finally, coming to the immediate present, some of the Papers presented at this Congress, and especially the four first scheduled, contain much worth-while information for the implementation of the programme for the "Modernisation and Mechanisation of the French Foundry Industry" under the best possible conditions.

Cast-Iron Roller Conveyors

A detailed Method for making Roller Conveyors in the Foundry

By J. Timbrell

The excellent Paper presented at the Nottingham Conference, by Mr. R. C. Shepherd, had several layouts using gravity roller conveyors in various forms. Mention was also made of the inferior grade, sometimes encountered, which was stated to be quite unsuited for the purpose of conveying moulds. There is no doubt that first-class substantial section structural steel, and rollers with bearings adequate for the load and which promise reasonable life in the hard moulding shop routine, are necessary.

A disappointing experience with light bearings, thin section material, and abnormally long delivery delays for better quality, prompted the writer to manufacture a supply entirely in cast iron. After several years' hard use, these are apparently indifferent to almost any foundry neglect, and show no appreciable signs of wear, when compared with the "bought-in" steel rollers coupled in places to them. These cast-iron rollers can be recommended for use in permanent runs, as they are naturally much heavier than the easily dented conveyors of steel-tubing and particularly for use under heavy moulds. There is an inherent inertia with these cast-iron rollers, but once turning they require no more effort than many of the ball-bearing type.

"All-core" Moulding Method

Made exactly as set out in this article, the rollers require no machining whatsoever; they can be assembled complete, after the normal fettling attention. By using the "all core" method of moulding, the rollers run true with their bearings and spindle, with no more play than is sometimes found in newly purchased rollers. By lengthening or shortening the main corebox, long rollers for singles, and short ones for doubles, can be made from the same tackle.

Roller diameter and length can be chosen to individual requirements, such as for light or heavy loads, but for the purposes of this article heavy duty 3 in. dia. by 15 in. long rollers are used for illustration; these run on roller bearings with ½ in. dia. rollers carried on ¼ in. dia. bar spindles. They are free to move endways on the spindle, until end thrust is taken by the bearing caps against the insides of the angle iron frame.

Fig. 1 shows a section of rollers and their assembly between 3 in. by 2 in. angle iron, secured in place and kept apart by the tie rods, one being shown at A. The sectional drawing above shows the common ¼ in. dia. countersunk screws, as they are "cast-in" in the roller casting. The caps are also cast with clearance holes to register with the three screws. The actual bearing rollers were originally made from ½ in. dia. bright bar—cut off into ½ in. lengths—until this material became in short supply. They were then made in cast iron exactly to size by a method to be set out later in this article. These cast-iron bearing rollers were quite as good as the plain steel ones after treating for an hour in the rumbler.

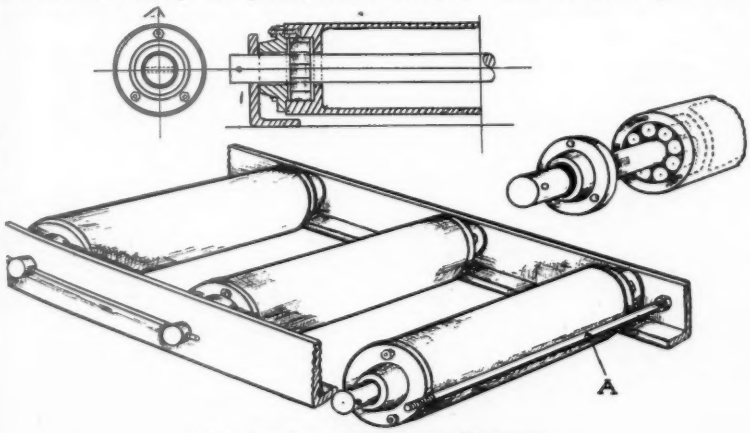

FIG. 1.—CAST-IRON ROLLER CONVEYOR.

Details of Coreboxes

Fig. 2 shows a set of roller cores ready for assembly, these are shown square, but to save core sand and also for larger numbers off, the main core box could be made round. Fig. 3 shows the construction of the main core box, the roller, part B, is made strictly parallel and of correct diameter. It is secured to the base C, and the corebox part, D, is bored to take the roller. The thickness of the cover core print, E, also provides added rigidity during the ramming up of the core, and moreover acts as a "stripper," to enable the roller to be drawn out first, leaving a perfectly true and parallel bore. Box rapping is unnecessary and should be avoided. Fig. 4 shows

Cast-iron Conveyors

the box prior to ramming up, and a clamp (F) is advised to ensure that the roller pattern is not rammed out of position during the core making. The inside barrel cores, G, Fig. 2, can be made as flat-backed halves, and then stuck together when dried.

Fig. 5 shows the coreboxes for making the cover cores, wherein the centre unit, H, acts as an internal stripper for the actual roller bearing surface. This centre unit ensures a true diameter and a strip without box rapping. The body corebox, J, is withdrawn first, then the unit H, which also forms the core print for the centre barrel core. The taper pins, K, form the holes for the screws, which are pushed into place when the cores are dried as shown at L, Fig. 2. The use of two of these coreboxes is advised, the one for the top

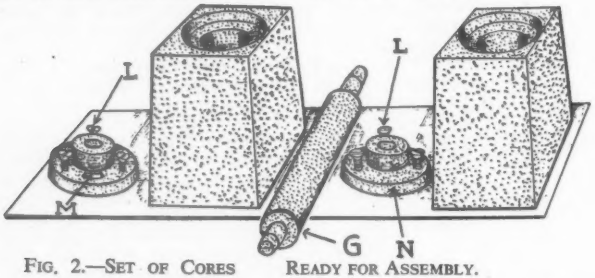

FIG. 2.—SET OF CORES READY FOR ASSEMBLY.

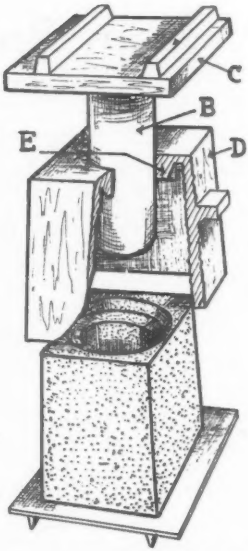

FIG. 3.—CONSTRUCTION OF THE MAIN COREBOX.

cover core has the inlet runner, M, secured permanently in place. The corebox for the bottom cover core is, of course, plain, as is shown at N.

Corebox Assembly

To assemble the cores accurately a well-fitting plug-gauge P, Fig. 6, is pushed down the two main cores to

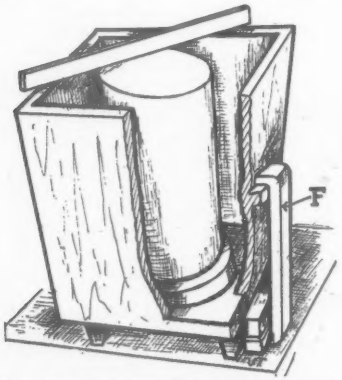

FIG. 4.—COREBOX ASSEMBLED READY FOR RAMMING.

check parallelity; if the cores are assembled warm, a dab of core-jointing paste, Q, on the joints, and also on the lower cover core, will firmly secure the cores and be proof against lift when the casting is poured. The centre barrel core R, Fig. 7, is then inserted, and the top cover core, S, is stuck into place. It will be noted that this top cover core has the inlet runner, which, of course, comes opposite a corner, so as to accommodate the small runner bush for pouring.

Fig. 8 shows the roller end-cap pattern, T. This also is made with a cover core and print, with the runner in place, to enable the pattern to be added to any small area vacant on a pattern plate without any

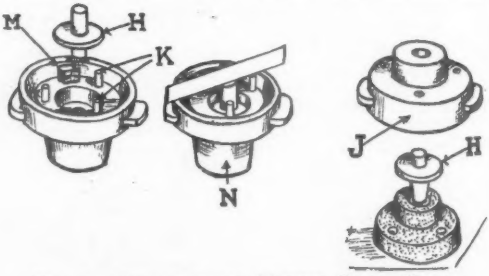

FIG. 5.—EQUIPMENT FOR MAKING COVER CORES.

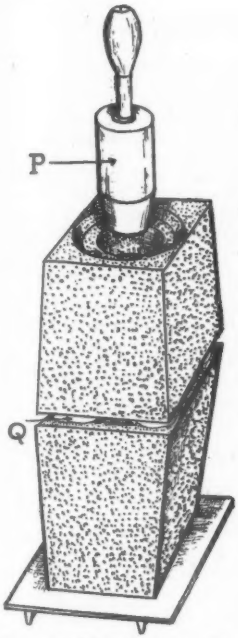

FIG. 6.—MAIN CORES ARE ASSEMBLED WITH A PLUG GAUGE.

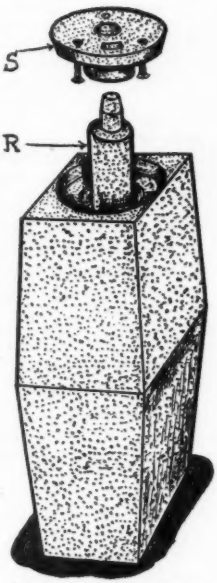

FIG. 7.—ASSEMBLY OF BARREL CORE AND COVER CORE.

setting. The inlet runner can be connected at any convenient point. The end-cap cover-corebox has the three taper holes made to cut through at the back shown at V. A cover core is shown at W and a cap casting at X.

Fig. 9 shows the method of making sufficiently accurate cast-iron rollers for bearings; six are shown to simplify drawing and description, but any number of rows may, of course, be put into a corebox. The roller patterns are pieces of bright ½ in. dia. bar, cut off

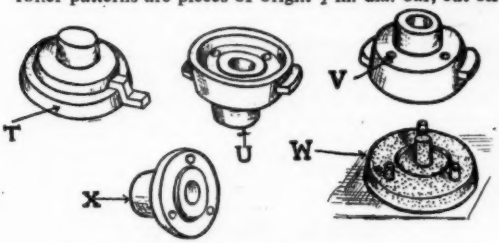

FIG. 8.—PATTERN EQUIPMENT FOR THE ROLLER END-CAP.

to length, allowing the thickness of the corebox stripping plate, B. The bearing roller patterns are secured to the corebox bottom plate, C. This strip method permits the patterns to be drawn out parallel and of correct diameter without box rapping and a core is shown at D. The top corebox E has a runner bar F with inlet pins for runners G. These cut through level with, and registering with, the rollers in the bottom core. A dab of core-jointing paste secures the cores together

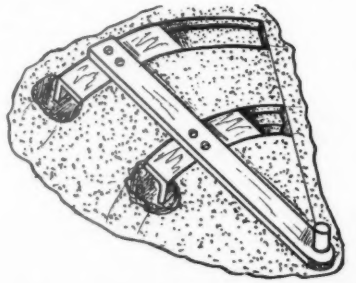

FIG. 10.—OPEN-SAND MOULDING OF BEND SECTIONS.

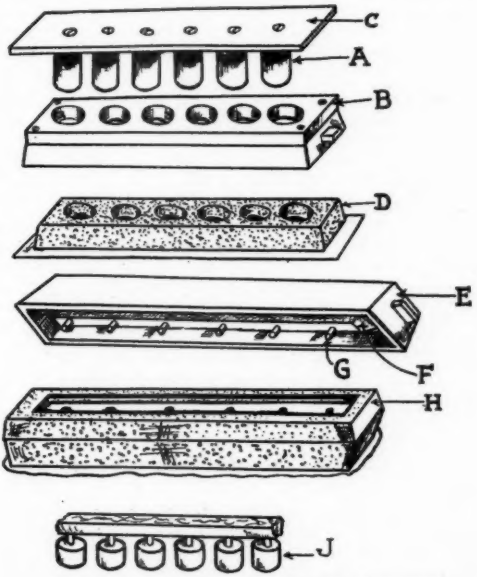

FIG. 9.—EQUIPMENT FOR MAKING CAST-IRON BEARING ROLLERS.

for pouring (H). Many hundreds of consistently true-to-size small castings (J) can be poured with a hand ladle. The roller castings can be used directly after rumbling without further treatment.

Difficulty in obtaining delivery of angle bends was overcome by making short-section pieces to the required radius, these were cast in open-sand moulds as shown at Fig. 10. The sections are shown with the under flange inside; for outside flanges they would, of course, be planned the reverse way. Cast-iron bends have several advantages over the bent angle irons, and part curve, part straight, sections, junctions, right angles, and turntables can be developed with a little planning and ingenuity.

Book Review

Statistical Year Book for 1946 (Tariff Supplement). Published by the British Iron and Steel Federation, Steel House, Tothill Street, London, S.W.1. Price 5s.

This book should, in the light of international planning, become quickly obsolescent, as there is sitting a Conference on Trade and Employment. This has for its object the reduction of tariffs and preferences. Yet having wearily awaited the implementation of the findings of other international congresses, we believe this book will be of direct use for a worth while period. The interpretation of the figures given as the tariff to be paid on iron castings by the twenty-four countries listed is for someone more expert than the reviewer. The figures quoted are often complicated by such additions as social provident, package, unloading, public works, sales, port and turnover taxes; by quay and paving dues, by preferential tariffs, primage and drawbacks. Some tariffs are on weight, others on value, and to make comparisons between the severity of the tariffs would mean the preparation of an extensive publication. However, this book is useful *now* if the export drive is to mean anything at all.

House Organs

The **October** issue of **The Nickel Bulletin** gives emphasis to electrodeposition and other coating methods in the number of extracts published on this subject. In addition, considerable material is devoted to heat and corrosion resisting alloys, with special reference to gas turbine design and materials. Extracts on nickel iron alloys include data on spectrographic analysis of a complex ferrous alloy and permanent magnet alloys. The Nickel Bulletin is obtainable free of charge from the Mond Nickel Company, Limited, Grosvenor House, Park Lane, London, W.1.

S. & W. Magazine for November

Published by Smith & Wellstood, Limited, Bonnybridge, Scotland.

This issue reports that the coke situation is curtailing output, but there are Government promises "that the fuel requirements of pig-iron makers will shortly be met in full, so that it should then be possible for them to satisfy all demands." Most of the magazine is, as it should be, of mainly domestic interest.

New Catalogues

Lip-pouring Crucible Furnaces.—The Morgan Crucible Company, Limited, of Battersea, London, S.W.1, following upon its showing at the Foundry Exhibition have now issued a special brochure covering the potentialities of their new power-tilted lip-pouring crucible furnace. Major improvement has been achieved by the incorporation of an oil hydraulic system of tilting. This refinement is typical of many others which could and should be applied to foundry plant. For instance, rough cast gears are still to be found attached to large-sized ladles, instead of using machine-cut gears running in an oil bath. The usefulness of this particular hydraulic gear can best be shown by quoting from the brochure. "For example, the 600-lb. furnace can pour as slowly as 20 lb. per min.; it can also pour at 2,000 lb. per min., or at any speed in between." An interesting feature is that the hydraulic unit can be made to serve a battery of furnaces; it is well illustrated on page 5, where the system is shown as applied to a pair of furnaces casting ingots. A lever controls the tilting and a foot pedal the movement of a turntable. The range available is from 400 lb. (brass) to ½ ton aluminium. The furnace bodies are in all cases removable, whilst either oil or gas is used as fuel. In the production of the brochure good use has been made of two-colour printing, the orange bordering being particularly effective. The publicity department merits high praise for the layout and presentation of the technical data. We presume that this catalogue is available to our readers on their writing to Battersea.

Chemical Apparatus. The Harry W. Dietert Company, 9330 Roselawn Avenue, Detroit 4, Michigan, U.S.A., have sent us a 12-page well illustrated pamphlet covering the apparatus needed for the determination of carbon and sulphur in iron and steel. It describes and numbers, but does not price, various components. One of the most interesting items is No. 3052—a heat deflector. Its function is to prevent the rubber stopper of a combustion tube from being overheated. This is effected by incorporating in the glass tube which passes through the stopper, two flattened bulbs, one at the end and one about half an inch therefrom. The diameter of the bulbs is about half that of the smaller diameter of the bung. Another gadget (No. 3035) is for retarding excessively rapid combustion and consists of a chemically pure nickel lid to cover the combustion boat. It carries a ¼-in. diameter hole located very near to its end. The reviewer found the catalogue extremely interesting and believes readers would have a similar reaction.

Cam Grinding. The excellency of the photography is the outstanding feature of a new catalogue just issued by the Churchill Machine Tool Company, Limited, of Broadheath, Manchester. Its twelve well-illustrated pages carry a convincing message of quality and craftsmanship of the four sizes of precision grinders dealt with.

News in Brief

AS FROM DECEMBER 20, the address of the Purchasing Officers Association will be 17-18, Henrietta Street, London, W.C.2.

JOHN BROWN & COMPANY, LIMITED, Clydebank, have received an order for two 18,000-ton tankers for the Tanker Corporation, Panama.

SHEFFIELD METAL & WIRE COMPANY, LIMITED, 34, Cambridge Street, Sheffield, have changed their name to Sheffield Metal Company, Limited.

VICKERS-ARMSTRONGS, LIMITED, are to convert the 23,424-ton Strathmore from a troopship to a peacetime vessel at their Walker-on-Tyne Yard.

A NEW FACTORY for the manufacture of agricultural machinery is to be erected at Kilmarnock by the Canadian firm of Massey-Harris, Limited.

WORK HAS BEEN STARTED on the erection of a block of offices at Swans Bank, Wallsend, for Swan, Hunter & Wigham Richardson, Limited, shipbuilders.

WHEADON & TOLCHER, LIMITED, mechanical and electrical engineers, etc., of 90-92, Cromwell Road, St. Jude's, Plymouth, have changed their name to Tolcher & Smith, Limited.

BARTRAM & SONS, LIMITED, Sunderland, who have recently launched the first of six vessels ordered in this country by a Lisbon company, are completely engaged on foreign orders.

THE CAPITAL OF Foundry Equipment, Limited, Linslade Works, Leighton Buzzard, Beds, has been increased by £500 in £1 ordinary shares, beyond the registered capital of £14,500.

THE NAME OF Ultra New Articles, Limited, manufacturers of metal materials, etc., of 40, Hamlet Road, Southend-on-Sea, has been changed to Thames Die Casting Products, Limited.

COLEMAN FOUNDRY EQUIPMENT COMPANY, LIMITED, 33, St. James's Street, London, S.W.1, have increased their capital by £15,000 in £1 ordinary shares, beyond the registered capital of £5,000.

THE FREETH STREET (Oldbury) works of Darlington & Simpson Rolling Mills, Limited, are to be closed at the end of the year, when the work will be transferred to the company's mills at Darlington.

SUMMERFIELD ENGINEERING INDUSTRIES, LIMITED, Westminster Bank Chambers, Chestergate, Macclesfield, have increased their capital by £10,000 in £1 shares, beyond the registered capital of £12,000.

THE CAPITAL OF Aluminium Die Castings (Erdington), Limited, 793, Chester Road, Erdington, Birmingham, has been increased by £9,900 in £1 ordinary shares, beyond the registered capital of £100.

THE ANTI-ATTRITION METAL COMPANY, LIMITED, Maidenhead, have established a Midlands sales office at 171, Gravelly Hill, Erdington, Birmingham (telephone: Erdington 1749). Mr. Oswald King will be in charge of the new office.

VICTOR PRODUCTS (WALLSEND), LIMITED (formerly Charles Crofton & Company (Engineers), Limited), Church Bank Offices, Wallsend, have increased their capital by £10,000 in £1 ordinary shares, beyond the registered capital of £25,000.

J. COLLIS & SONS, LIMITED, engineers, etc., of 42-43, Regent Square, Grays Inn Road, London, W.C.1, have increased their capital by £25,000 in £1 4½ per cent. cumulative participating preference shares, beyond the registered capital of £75,000.

A TENDER OF £58,434 by Mitchell Engineering, Limited, Peterborough, for coal-bunkering equipment at Albert Quay is recommended for acceptance by Aberdeen Harbour Board. The plant has many special features and will combine both discharging and bunkering facilities.

BRITAIN'S FIRST main-line Diesel-electric locomotive is undergoing local trials at Derby, where it was built by the L.M.S. It is powered by a 16-cylinder 1,600-h.p. engine, which, together with the control equipment, has been designed and manufactured by the English Electric Company, Limited.

ACHESON COLLOIDS, LIMITED, of Great Britain, and the Acheson Colloids Corporation, of America, have now come under the joint control of Mr. Howard A. Acheson, son of the founder of the two organisations, which are the two largest producers of colloidal graphite in the world.

THE GOVERNMENT'S INTENTION to mark the centenary of the Great Exhibition of 1851 by a national display illustrating the British contribution to civilisation in the arts, science and technology, and industrial design was announced by Mr. Herbert Morrison, Lord President of the Council, in the House of Commons.

ORDERS FOR THREE 28,000-ton tankers for the Anglo-Saxon Petroleum Company, Limited, the largest tankers yet to be constructed in British yards, have been placed with Swan, Hunter & Wigham Richardson, Limited, Wallsend; Cammell Laird & Company, Limited, Birkenhead; and Harland & Wolff, Limited, Belfast. The vessels are to be delivered in 1950.

ANDREW STRANG & COMPANY, LIMITED, ironfounders, of Hurlford, Ayrshire, celebrated the jubilee of their formation by the holding of a dinner at Ayr. Mr. Stuart M. Fraser presided. Former employees, Mr. A. Fraser, Mr. W. Strang and Mr. J. Morris, were presented with gifts on behalf of the firm by Miss Borland, the secretary and a director of the company.

THE NOVEMBER ISSUE of the "Nickel Bulletin" gives considerable attention to the subject of constructional steels and includes a number of abstracts from the American Society of Metals. There is, in addition, further interesting material on heat- and corrosion-resisting alloys. The "Nickel Bulletin" is obtainable free of charge from the Mond Nickel Company, Limited, Grosvenor House, Park Lane, London, W.1.

THE BOARD OF Associated Electrical Industries, Limited, announces that with effect from January 1, 1948, its subsidiary, the Edison Swan Electric Company, Limited, will absorb two other subsidiaries,

Edison Swan Cables, Limited, and the Cosmos Manufacturing Company, Limited, whose principal activities are cable-making and the production of thermionic and radio valves. The name of the Edison Swan Electric Company will be unchanged.

G. HOPKINS & SONS, LIMITED, brewers' and bottlers' engineers and coppersmiths, of Highbury, London, N.7, have received Treasury consent for the issue at 11s. per share of 50,000 6 per cent. cumulative preference shares of 10s. each and at 4s. 3d. per share of 196,291 ordinary shares of 2s. each. The preference shares are offered to preference-share holders and the ordinary to ordinary-share holders registered on November 28, and will be allotted in proportion to the shares held.

THE TREASURY have announced that they propose to make an Order exempting from purchase tax domestic space-heating appliances incorporating electric fans or electric pumps or both, designed to consume in all not more than 100 watts, but not including appliances operated by gas. The Order will also take out of the intermediate rate of 65 per cent. other space-heating and water-heating appliances which, although operating from electric or gas mains, do not use electricity or gas as the source of heat.

MR. J. D. STILL, a director of Redpath, Brown & Company, Limited, stated at the annual general meeting that the company would provide all the steel construction in connection with the extensions to Portobello power station and the Clydebank power station, Glasgow, and were to assist with the large Braehead power station in Glasgow. He also told the shareholders that the steelwork contracts for the new House of Commons, the hangar for the Brabazon air liner, and the factory for British Nylon Spinners, Limited, were on the point of completion.

EXPORTS FROM THE Tyne during the first nine months of this year included:—Firebricks and fireclay, 3,346 tons, compared with 3,796 tons in 1946 and 7,882 tons in 1938; iron and steel manufactures, 42,473 tons (49.302 tons and 35,954 tons); lead goods, 5,566 tons (6,890 tons and 18,756 tons); and pitch and tar, 12,525 tons (13,782 tons and 45,853 tons). Imports for the same period included:—Iron and steel manufactures and scrap, 49,024 tons (32,096 tons and 75,163 tons); metals and minerals, 43,562 tons (25,709 tons and 139,903 tons); and iron ore, 280,718 tons (237,578 tons and 342,487 tons).

CONVERSION TO OIL FIRING of 60 per cent. of the basic open-hearth furnaces at the Templeborough Works of the Steel, Peech & Tozer branch of the United Steel Companies, Limited, will have been completed during the next few months. The Park Gate Iron & Steel Company, Limited, Rotherham, who have already converted five furnaces, intend to equip their entire range for oil firing. It is reported that within the next three months one in three of the open-hearth furnaces in the Sheffield area will have been converted to oil; the estimated saving of coal is 7,000 tons a week by the end of the winter.

Steel and the Export Drive

Implications of the Cripps' Targets

The British Iron and Steel Federation estimate that at least 3,100,000 tons of finished steel will be needed for direct and indirect export next year. The greater part of this total will be exported in the form of machinery and other manufactured articles by steel-consuming industries. It is pointed out in an article in the November issue of the B.I.S.F. Monthly Statistical Bulletin that, so far as direct exports of steel are concerned, the targets set by Sir Stafford Cripps are in terms of value, at September, 1947, prices, and the tonnage equivalent is dependent upon the relative proportions of higher and lower valued items.

Assuming that the distribution is the same as in the third quarter of 1947, the target for finished steel is equivalent to an annual rate of 1,241,000 tons in mid-1948, rising to 1,302,000 tons by the end of the year. This is less than the 1946 export of finished steel, 1,746,600 tons, and below the 1947 rate so far. It compares with a 1938 figure of approximately 1,435,900 tons.

The chief reason for this restriction of direct steel exports, it is stated, is the need to provide steel for the expansion of the metal-using industries at home for the manufacture of machinery and other dollar-earning exports. For the time being, this will be the steel industry's major contribution to the export drive. On the basis of such information as is available, it would appear that the supply of finished steel at a rate of 2,200,000 tons per annum will be needed to meet the targets of the steel-consuming trades at the end of 1948.

Duty-free Importation of Machinery

Under Section 10 of the Finance Act, 1932, as amended, the Treasury are empowered, after consultation with the Board of Trade, to license the duty-free importation of machinery. It is a statutory requirement that application for the issue of a licence under the section should be made before the machinery is imported. The Board of Trade point out that cases continually arise in which application is made for a Treasury licence after the consignment of machinery has reached the United Kingdom. Whatever the merits of the case for duty-free importation, it is not possible under the statutory provisions for a Treasury licence to be granted in such circumstances.

Importers should accordingly note that, in the case of any machinery which it is desired to import free of duty, it is essential, in order that the application for exemption from duty may be considered, that the application for such exemption should be made before the machinery reaches the United Kingdom. The application can then be considered on its merits.

DALLOW LAMBERT & COMPANY, LIMITED, of Spalding Street, Leicester, have placed on the market a new type of a universal fitting for collecting dust from awkward tool settings experienced on all types of tool and cutter grinding machines, surface grinders, etc.

Company News

Venesta—Dividend of 10% (same).

Press Caps—Dividend of 7½% (same).

Cargo Fleet Iron Company—Dividend of 5% (same).

Briton Ferry Steel Company—Interim dividend of 5% (2½%).

Birmid Industries—Dividend of 10% and bonus of 10% (same).

Charles Churchill & Company—Interim dividend of 10% (same).

A. E. Jenks & Cattell—Net profit for the period to August 2, 1947, £21,592 (£23,794).

Mann, Egerton & Company—Dividend of 40% (30%) and bonus of 60% (nil), making 100% (30%).

Moss Gear Company—Final dividend of 12½% (same) and bonus of 5% (same), making 25% (same).

Wilkes—Net profit for the year ended July 31, £4,379 (£3,262); tax, £1,832 (£1,195); dividend of 10% (same); forward, £4,289 (£3,718).

Hackbridge & Hewittic Electric—Interim dividend of 4%. The company was made public and the capital was increased in March, 1947.

Richard Thomas & Baldwins—Interim ordinary dividend of 5% (same) and further payment of 3½% on the preference shares (same).

Trianco—Profit for 1946, £24,635 (£27,512); to tax, £10,000 (£13,000); general reserve, £5,000 (same); final dividend of 5%, making 10% (same).

Universal Grinding Wheel Company—Ordinary dividend of 20%, tax free (15%, tax free), and a participating dividend of 3%, less tax, on the preference shares (2%, less tax).

Concentric Manufacturing Company—Profit for the year ended September 30, £47,040 (£20,732); to tax, £28,109 (£12,145); tax reserve, £6,000; dividend of 25%; forward, £2,871 (£2,314).

Midland Iron & Hardware Company (Cradley Heath)—Final dividend of 150%, less tax, making 250%, less tax (100%, tax free). The company was made public in June, 1947.

Marco Refrigerators—Trading profit, etc., to September 30, £72,256 (£61,704); to taxation, £40,000 (£42,200); final dividend of 22½%, making 30% (10%); forward, £30,720 (£20,993).

R. & J. Dick—Net profit for the year ended August 31, £37,543 (£27,552); written off goodwill, £15,000 (nil); contingencies reserve, nil (£10,000); dividend of 25% (20%); forward, £11,804 (£10,711).

Irish Wire Products—Net profit for the year ended March 31, £14,705; transfer fees, £6; to tax, £8,000; final dividend of 7% (6%), making 10% (8%); contingencies account, £2,000; forward, £1,814 (£1,310).

Turner & Newall—Net profit for the year ended September 30, £727,058 (£715,420); to pension fund, £20,000 (same); general reserve, £200,000 (£100,000); final dividend of 11½%, making 15% (12½%); forward, £393,592 (£382,573).

Thos. Goldsworthy & Sons—Net balance for the year ended June 30, after depreciation, etc., £19,506 (£30,247); no ordinary dividend (7%); to reserve for taxation, £3,000 (£3,500); general reserve, £5,000 (same); forward, £1,376 (£1,120).

T. M. Birkett & Sons—Net profit for the year ended July 31, after taxation, depreciation, etc., £51,183 (£7,034); final dividend of 25%, making 30%, £14,025 (£6,800); to reserve, £8,000 (nil); dividend equalisation account, £10,000 (nil); forward, £24,920 (£5,762).

Fairfield Shipbuilding & Engineering Company—Profit to June 30, after tax, £215,471 (£164,164); to directors' fees, £4,000 (£3,390); depreciation, £75,000 (£50,000); reserve for contingencies, £75,501 (£50,000); dividend of 10% (same); forward, £121,640 (£95,170).

Alvis—Net profit for the year ended July 31, after depreciation, tax, etc., £19,143 (£35,453); credit from price settlements on prior year's contracts, £3,202 (nil); net credit from life-assurance policy, £5,000 (nil); to reserve, nil (£10,000); dividend of 5% (6%); forward, £51,319 (£44,599).

Hale & Hale (Tipton)—Net profit for the year ended August 4, after depreciation, tax, etc., £18,902 (£22,523); to dividends on the 5½% cumulative preference shares, £3,025 (£2,887); final ordinary dividend of 15%, making 20% (same); general reserve, £5,000 (same); forward, £13,936 (£14,059).

S. Smith & Sons (England)—Net profit for the year ended August 2, after depreciation, tax, etc., £135,543 (£130,395); to research, development and contingencies reserve, £25,000 (£20,000); preferred ordinary dividend of 17½% (same); deferred dividend of 37½% (same); forward, £119,278 (£101,949).

B. & F. Carter & Company—Trading profit to July 31, £17,486 (£15,937); dividend on investments, £44 (£42); to directors' fees, £350 (£450); depreciation, £9,144 (£4,778); income tax and E.P.T. reserve, £2,000 (£7,898); dividend of 10% and bonus of 5%, making 15% (10%); forward, £12,322 (£11,236).

Light Production Company—After crediting E.P.T. recovery, £15,500 (£35,000), profit for the year ended April 30, £19,319 (£24,111); to tax reserve, £3,750 (£9,250); depreciation, £3,000 (nil); written off leasehold premises, £228 (nil); general reserve, nil (£3,000); dividend of 10% (20%); forward, £9,453 (£12,026).

Elmore's Metal Company—Loss for 1946, £202 (£224), reducing the credit balance brought in from £12,274 to £12,072. The report states that no forecast can be made of the date when trading can be resumed. The audited accounts of the Metall Company at the end of 1946 showed an accumulative loss of Rm.962,661.

Engineering & Lighting Equipment Company—Net loss for the year ended March 31, £10,014 (profit £13,309); preference dividend for the half-year to June 30, 1946, £2,270 (£5,013 for the year); ordinary dividend, nil (8%); after crediting £2,594 on sale of Acme works, £823 for canteen funds, debit forward, £6,295 (credit £2,571).

Kendall & Gent—Profit for the year ended September 30, £16,609 (£25,770); to depreciation, £6,448 (£6,846); fees, £276 (£414); tax, nil (£5,000); war contingencies reserve not required, nil (£10,000); to special depreciation, nil (£4,000); final dividend of 10%, making 15% (same); bonus, nil (5%); general reserve, nil (£5,000); forward, £24,224 (£23,414).

Shotts Iron Company—Balance of profit and loss account for the year ended September 30, after crediting taxation provision of £50,000 no longer required, and provision for interim income in terms of the Coal Industry Nationalisation Act, £124,068 (£60,835); dividend of 5% (same); forward, after allowing for preference dividends, £155,761 (£49,820).

Joseph Lucas—Profit from trading account for the year ended July 31, after taxation, etc., £335,779 (£364,394): profit from earlier years, £58,482 (nil); to directors' fees, £2,000 (£1,667); obsolescence, £50,000 (same); general reserve, £100,000 (same); employees' funds, £25,000 (£15,000); final dividend of 15% (12½%), making 17½% (15%); forward, £142,752 (£134,754).

Associated Equipment Company—Profit for the year ended September 30, including reserves of earlier years no longer required, and after expenses, depreciation, etc., £864,000 (£950,000); to taxation, £626,500 (£667,500); employees' benefit reserve, £20,000 (same); general reserve, £30,000 (£45,000); final dividend of 1s. 6d., making 2s. 6d., tax free (same); forward, nil (£30,000).

Dennis Bros.—Trading profit to September 30, after estimated tax, £161,877 (£180,299 after estimated E.P.T.); other income, £7,164 (£7,416); to depreciation, £37,416 (£31,139); fees, £5,700 (£5,305); benevolent fund, £3,000 (same); income-tax reserve, nil (£53,829); final dividend of 2s. 2d. (1s. 2d.) per 1s. share, making 2s. 6d. (1s. 6d.), equal to 250% (150%); forward, £182,521 (£162,891).

Wallis Tin Stamping Company—Trading profit for the year ended June 30, after all expenses and depreciation, £49,253 (£33,891, which is shown in the 1946 accounts as £28,956 after E.P.T.); to directors' fees, £300 (£200); tax, £18,703 (£23,840); dividends on the 6% preference shares, £2,470 (£1,906); final ordinary dividend of 33⅓% (12½%), making 40⅝% (20%); forward, £21,725 (£10,489).

J. H. Fenner & Company—Balance on trading accounts for the year ended June 30, £139,405 (£97,748); to directors' fees, £650 (£643); depreciation, £7,038 (£5,955); net profit, £131,717 (£91,150); to rehabilitation expenses, £45,237 (nil); taxation, £17,081 (£47,699); tax reserve, £54,463 (£20,750); written off goodwill, £9,999 (nil); war damage insurance, nil (£297); dividend of 10% (7½%); forward, £26,762 (£32,481).

John Shaw & Sons, Wolverhampton—Trading profit and other income for the year ended June 30, £13,329 (£7,013); dividends from subsidiary companies, £82,869 (£47,123); to directors' fees, £1,000 (same); depreciation, £134 (£145); taxation, £43,890 (£22,609); net profit, £51,174 (£30,382); to general reserve, £20,000 (same); dividend equalisation reserve, £20,000 (nil); dividend of 10% (same); forward, £20,662 (£18,700).

Weardale Lead Company—Proceeds from sales of lead ore, etc., for the year to September 30, £29,939 (£21,602); stocks on hand, £3,208 (£3,456); investment income, £334 (£395); profit on sale of investments, nil (£1,673); to general expenses, etc., £22,579 (£23,858, including £1,673 to depreciation reserve); profit, £7,446 (£941); profit on investment sales, £713 (nil); available balance, £4,276; dividend of 5% (nil); credit forward, £2,929 (debit £1,360).

Walmsleys (Bury)—Net profit on work completed during the nine months ended June 30, including income from properties and investments, and after charging depreciation and fees, £62,150 (£84,599) for the previous year); dividends on shares in two subsidiary companies—one for 16 months to date, and the other for 12 months, £22,238 (£15,071); to pensions, £5,456 (£6,348); tax, £36,825 (£43,000); final dividend of 6%, making 12% for nine months (15% for the previous year); forward, £179,087 (£163,930).

Universal Grinding Wheel Company—Trading profit to September 27, £382,690 (£226,305); investment interest, etc., £7,729 (£3,801); to income tax, £137,000 (£75,000); E.P.T. and profits tax, £70,000 (£40,000); depreciation, £25,426 (£22,872); directors' fees, £3,600 (£3,400); net profit, £154,393 (£88,834); to 5% preference dividend, £11,000 (£10,500); participating dividend of 3% (2%); ordinary dividend of 20% (15%), tax free; general reserve, £75,000 (£50,000); forward, £56,709 (£34,916).

Tube Investments—Accounts of the parent company for the nine months to August 2 show profits of subsidiary companies for the year to August 2, after E.P.T. (5 months), £4,827,013 (£2,403,429); to depreciation, £597,958 (£355,007); profits tax, £427,304 (nil); income tax, £1,904,382 (£902,069); net profit attributable to outside interests, £11,469 (£8,978); special depreciation reserve, £500,000 (£400,000); net cost of past service benefits under employees' pension scheme, £350,000 (nil); retained by subsidiary companies as undistributed profit balances, £89,515 (£61,832): net profit, £901,385 (£675,543); other income, £113,906 (£164,173); to directors' fees, £900 (£1,435); preference dividends, £15,948 (£31,896); general reserve, £400,000 (£300,000); final ordinary dividend of 12½%, making 25% (22½%); final dividend at the same rate on the liaison ordinary shares (same); forward, £407,919 (£328,978).

Contracts Open

Any date given is the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Dagenham, January 10—Iron castings, etc., for the Borough Council. The Borough Engineer and Surveyor, Civic Centre, Dagenham.

Dublin, January 2—Supply of eight Venturi meters, for the Town Council. The City Engineer, 28, Castle Street, Dublin.

Hertford, January 5—Manhole covers, gulley grates, etc., for the Corporation. The Borough Surveyor and Engineer, The Castle, Hertford.

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THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

Personal

DR. E. W. SMITH has been appointed to the board of Submarine Cables, Limited.

COL. L. EDGE and MR. V. A. B. HUGHES have joined the board of the Chloride Electrical Storage Company, Limited.

MR. W. S. ROBINSON has resigned from his position as managing director of the Zinc Corporation, Limited. He has also resigned his seat on the board. He has agreed to accept the office of president of the Corporation.

MR. O. A. PALLETT, supervisor of purchases of the British Thomson-Houston Company, Limited, has been appointed chairman of the A.E.I. group-purchasing committee to take effect on MR. J. BILLINGTON'S retirement on December 31.

MR. J. B. GRUNDY, sales manager of Blackstone & Company, Limited, manufacturers of Diesel engines, etc., of Stamford, Lincs, has been appointed to take charge of the estimating and tender work of R. A. Lister & Company, Limited, engineers and ironfounders, of Dursley, Glos.

MR. W. F. JEMISON, formerly manager at Lowood Works and now Worksop manager of General Refractories, Limited, received a presentation recently from the Lowood staff to mark the occasion of his transfer. MR. G. JOHNSTON, his successor, received a presentation from the Wharncliffe staff.

MR. CLAUDE DUMBLETON, a director of Baker Perkins, Limited, manufacturing engineers, etc., of Peterborough, has left for Rio de Janeiro to confer with the company's resident representatives in Buenos Aires and Mexico City and arrange sales matters in connection with the Argentine, Brazil, Chile, Peru and Mexico.

MR. C. E. ALDRIDGE, general sales manager of Morris Industries Export, Limited, has been appointed general manager of Nuffield Exports, Limited, in place of MR. R. F. HANKS, who has been appointed vice-chairman of the Nuffield organisation. MR. D. HARRISON, previously sales promotion manager, will take Mr. Aldridge's place as general sales manager.

MR. DOUGLAS JAY, M.P., is to be appointed Economic Secretary to the Treasury. He was Assistant Secretary, Ministry of Supply, 1941-43, Principal Assistant Secretary, Board of Trade, 1943-45, and Personal Assistant to the Prime Minister, 1945-46. In October of this year he was appointed Parliamentary Private Secretary to the Chancellor of the Exchequer. Mr. Jay is a well-known economist.

MR. S. F. STEWARD, who has been appointed chairman-designate of the South-Western Area Electricity Board, is a director of E. R. & F. Turner, Limited, manufacturers of flour and provender milling machinery, of Ipswich. He was formerly Director of Industrial Electrical Equipment, Ministry of Supply, Director of General Machine Tools, Ministry of Supply, and Official Chairman, Machine Tool Advisory Council.

MR. E. A. LANGHAM has relinquished his appointment as sales manager in the sales division of the British Aluminium Company, Limited, to take up a new appointment as general manager for the company in India. MR. A. W. LANGHAM, who has been manager of the sales planning department, will, for the present, undertake responsibility for sales as well as sales planning departments in the sales division, with the title of sales manager.

SIR PATRICK HANNON, who has been Conservative Member of Parliament for the Moseley Division of Birmingham for nearly 27 years, will not seek re-election at the next General Election. Sir Patrick, who is 73, is president of the National Union of Manufacturers and a vice-president of the Federation of British Industries. He is a director of B.S.A. Guns, Limited, B.S.A. Tools, Limited, Birmingham Small Arms, Limited, of which he is deputy chairman, James Booth & Company (1915), Limited, and other companies.

SIR GEORGE USHER, managing director of International Combustion, Limited, and chairman of Aberdare Cables, Limited, is visiting South Africa in connection with the development of the newly-established company, Aberdare Cables of South Africa, Limited. The work on the factory now under construction for the company at Port Elizabeth is well advanced. Sir George is taking the opportunity during his stay in the Dominion of making an extensive tour on behalf of his group of British companies in connection with the export drive.

MR. ASHLEY S. WARD, chairman of Thos. W. Ward, Limited, and other associated companies, has relinquished the chairmanship of Lowmoor Best Yorkshire Iron, Limited. MR. GEORGE WOOD, deputy chairman of Thos. W. Ward, Limited, has been appointed in his place. Other changes on the board of this company include the election of MR. C. L. FRY and MR. W. W. HICKMAN as directors, and the appointment of Mr. Fry and MR. R. STUBBS as joint managing directors. The position of works manager has been taken over by MR. G. F. HANSON.

Wills

FELLOWES, A. E., shipping manager of the Stanton Ironworks Company, Limited £2,722

HALL, E. W., of Retford, Notts, lately of the Shipbuilding Employers' Federation £4,129

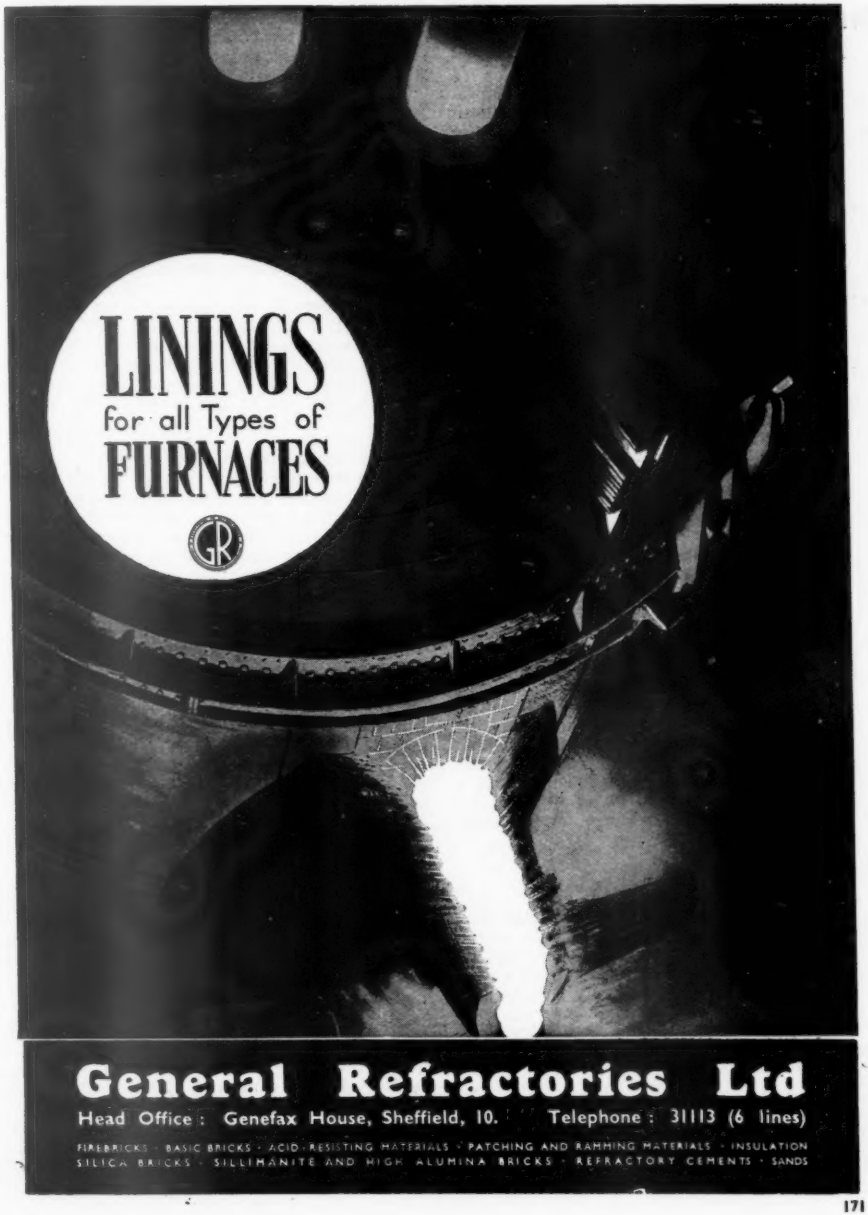
SIMPSON, HERBERT, a director of the Horsehay Company, Limited, ironfounders, of Horsehay, Wellington, Salop £24,327

SHACKLETON, EDWIN, chairman of Mitchell, Shackleton & Company, Limited, manufacturers of steel forgings, of Patricroft, Lancs £120,140

MORTON, W. H., a director and secretary of Bruce Peebles & Company, Limited, manufacturing electrical engineers, of Edinburgh £15,192

READ, ARCHIBALD, of Cuddington, Aylesbury, a former chairman and managing director of Pryce Jones, Limited, and who took part in the formation of the British Iron and Steel Federation £2,811

MCQUISTAN, A. N., a director and general manager of the South Durham Steel & Iron Company, Limited, and the Cargo Fleet Iron Company, Limited, and a director of a number of other companies £104,699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Raw Material Markets

Iron and Steel

Although pig-iron production pursues an upward trend, the expansion is not commensurate with the increasing requirements of the steelworks and foundries. Additional blast furnaces cannot be put into operation until ampler supplies of hard coke are assured. Meanwhile, high-phosphorus irons and hematite are particularly scarce and deliveries represent no more than minimum tonnages. The engineering foundries are not so badly placed as they are not confined to the use of one particular grade of pig-iron, but the light foundries can neither get sufficient high-phosphorus pig-iron nor cast-metal scrap.

There is no material change in the position at the re-rolling mills. British steelmakers are maintaining deliveries of billets, sheet bars, etc., at a fairly high level and find a ready market for any discards which they have to offer. But there is a wide gap between supply and maximum demand which it is impossible to bridge with the present meagre tonnages coming to hand from overseas. There has recently been a steep rise in the price of Belgian billets and even at the present high prices the Continental producers have little to offer, as they find it more profitable to work up their own material. Sheet mills in this country are fairly well placed for heavy slabs, but more sheet bars are urgently wanted for the production of light sheets, and the demand for strip is more urgent than ever.

During the past few weeks, clearances of plates and sections have undergone a pronounced acceleration. The mills have achieved exceptionally heavy outputs and delays arising from lack of rail transport have been considerably reduced. Nevertheless, P.M.L. priority requirements are so heavy that little consideration can be extended to consumers who do not fall into this category, and even export allocations have to be kept within strictly-defined limits. Overseas demand for all classes of steel products shows no sign of abatement and it may be that more steel will have to be allocated for shipment in the New Year in exchange for foodstuffs and raw materials.

Non-ferrous Metals

The puzzle of the tin price revision remains unsolved and it seems that no alteration will be made before January 1, which, it will be remembered, was a day of many surprises in 1947. Business in this metal is now restricted because the Ministry of Supply is only prepared to sell on a basis computed on the average consumption in the third quarter. This is, in effect, rationing, but presumably normal conditions will obtain after the fresh valuation for sterling tin has been announced. This decision is deferred until the United States and Bolivia have adjusted their differences on the question of what is a fair price for the 1948 contract for supplies of tin concentrates by the Bolivian tin-mining interests. Under the terms of the British Government's contract with Bolivia the Ministry of Supply must pay an equivalent price for concentrates coming to Britain, and, since it would be obviously unfair to discriminate in favour of the South American Republic, it must follow that payment to other suppliers, such as Malaya, will be made at an equal rate. In short, an adjustment in the world price of tin is awaited, and this is likely to take the form of a sharp increase. Tin-bearing scrap is anticipating this rise and gunmetal ingots have gone up appreciably. Nevertheless, the uncertainty is disturbing and the sooner matters are straightened out, the better it will be for the trade.

Lively price movements continue to activate the scrap market in this country, and it is interesting to note that the United States secondary-metal markets have already staged a recovery which may not yet have achieved its zenith. It is currently reported that the U.S. copper producers are quite satisfied with the ruling price level, and a similar position obtains in zinc and lead. Nevertheless, there is an upward movement which, it is felt, is only just being resisted, a fact not very surprising in view of the persistent buying by domestic consumers anxious to build up stocks and the U.S. Government's stockpiling plans. It is, in fact, very difficult to visualise any setback in values during the coming months and most traders feel that we shall be lucky to get through the next few weeks without an upward movement being, as it were, forced upon the American producers. And yet for the long term, *i.e.*, a year or 18 months, there is an overriding conviction that from the present high levels there must be a setback.

In due course the consuming side of the non-ferrous industry must become saturated with tonnage, and it is then that cracks will appear in the price structure. Given a sound free market in futures capable of taking up the slack and absorbing the selling pressure, which will, of course, cause a decline in values spread over a period, the difficulties inherent in the move back to more normal quotations should be overcome. But if the present artificial system is retained, disaster may overtake the industry.

Obituary

MR. JAMES MACLEOD, of A. & J. Inglis, Limited, shipbuilders, etc., of Glasgow, died on December 1.

MR. ALBERT FIELD, for many years Northern representative of Cannon Iron Foundries, Limited, Bilston, died recently.

MR. JAMES FREDERICK NICHOLSON, a director of the Bright Screw Company, Limited, Leeds, died recently at the age of 42.

MR. HENRY HILLMAN, saw-mill manager of the Staveley Coal & Iron Company, Limited, Chesterfield, died recently at the age of 54.

MR. JOHN PROBERT, representative of Newton Chambers & Company, Limited, ironfounders, etc., of Sheffield, for more than 40 years, died on December 2.